The NEAT Camera Project

Ray L. Newburn, Jr., Eleanor Helin, & Steve Pravdo

Jet Propulsion Laboratory,
California Institute of Technology
Pasadena, CA 91109

The NEAT (Near Earth Asteroid Tracking) camera system consists of a camera head with a 6.3 cm square 4096x 4096 pixel CCD, fast electronics, and a Sun Spare 20 data and control computer with dual CPUs, 256 Mbytes of memory, and 36 Gbytes of hard disk, The system was designed for optimum use with an Air Force GEODSS (Ground-based Electro-Optical Deep Space Surveillance) telescope. The GEODSS telescopes have 1 m f/2.15 objectives of the Ritchey-Chretian type, designed originally for satellite tracking. Installation of NEAT began July 25 at the Air Force Facility on Haleakala, a 3000 m peak on Maui in Hawaii.

The Loral CCD in the camera has 15μm pixels, which gives us a resolution of 1.4 arc seconds per pixel at the scale of GEODSS. Centroiding should allow us to make excellent astrometric measurements. We will cover 1.6 x 1.6 degrees in each image or about 2.5 sq. deg. per frame. **This year, during the early operational phase, we will use 120** second exposures, which should take us to about magnitude V = 22. Initially the readout time will be just slightly less than the exposure time, so we will cover about 20 **sq. deg. in a half hour before repeating the same fields two additional times.** We will cover about 100 sq. deg. per night during this period.

Near the end of this calendar year we will install new high speed analog electronics chains, which should decrease the readout time to 10-15 seconds. **At that time we plan go to 10 second exposures, taking us to only V = 19.3** but increasing coverage to about 1000 sq. deg. per night. Our current understanding with the Air Force is that we can operate 12 nights **per month.**

Telescope operation, data taking, and data analysis are completely computer controlled by the Spare 20. Phillips Research Corporation personnel, who operate the GEODSS telescopes for the Air Force, will feed the computer a JPL supplied list of observational field centers each evening and will transmit a table of astrometric positions of moving objects to JPL the next morning, where each will be checked against known objects. Those with motion that indicates the possibility that they are near-Earth objects will be added to a list for follow-up observations the next night at GEODSS, at AMOS [the colocated Air Force facility on Maui), at JPL's Table Mtn. Observatory, or at other cooperating NEA observatories.

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